

EXHIBIT A

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CURRICULUM VITAE FOR JOHN F. MCCARTHY, SC.D., C.I.H.

JOHN F. MCCARTHY, Sc.D., C.I.H.

PRESIDENT

BACKGROUND SUMMARY

- 1988 – President, Environmental Health & Engineering, Inc.
- 1992 – Lecturer, Dept. of Environmental Health, Harvard School of Public Health
- 1980 – 1987 Research Scientist/Director, Aerosol Characterization Laboratory, Massachusetts Institute of Technology
- 1978 – 1980 Research Scientist, Massachusetts Institute of Technology

EDUCATION

- Sc.D. Environmental Science and Physiology, Harvard University, 1987
- M.S. Environmental Health Sciences, Harvard University, 1978
- B.S. Biology, Boston College, 1973

EXPERIENCE

As President of Environmental Health & Engineering, Inc. (EH&E), Dr. McCarthy has led investigations for a wide variety of exposures to toxic pollutants and infectious agents and their associated health effects. His work has focused on the analysis of pollutants originating from both outdoor and indoor sources, as well as pollutant transport through various media. He specializes in problem identification and assembly and management of interdisciplinary teams to address the various areas of concern that arise with different clients. Dr. McCarthy provides technical and administrative design direction to the study team, including the development and application of novel analysis techniques and the implementation of field monitoring studies. Relevant air quality experience includes the following:

Product Evaluation

Served as Principal Investigator of a two-year, multi-phased investigation of “Chinese Drywall” conducted on behalf of the U.S. Consumer Product Safety Commission. The investigation included: identification of markers of problem drywall, in-home evaluations of environmental quality and corrosion, health impact analyses, chamber-testing of drywall samples to identify emissions and corrosion rates, evaluations of drywall from domestic (U.S.) suppliers, and an assessment of temporal variability of conditions in homes.

Directed a major product evaluation for a national retailer, manufacturer and importer of clothing to determine formaldehyde emission rates from various clothing materials. The assignment involved determining emissions utilizing controlled environmental chambers under both static and dynamic



conditions, performing a sensitivity analysis over a wide range of temperatures and humidities, and recommending limits of acceptability for materials.

For the Commonwealth of Massachusetts, performed a detailed analysis on a number of waterproofing products that had been used in a major state facility that were not performing properly. Through comparison with ambient samples and headspace analysis of various products to identify specific chemical agents, the problem material was isolated and identified. Additional dynamic analyses of building system mockups in environmental chambers permitted precise determination of product cure time to be made.

Developed a quantitative, controlled simulation system to evaluate the potential release of asbestos fibers from a respirator filter. This included evaluating potential release for inhalation volumes associated with various external work levels, respiratory frequency, and "stress" on respirator components.

Principal-in-charge of a study to evaluate the potential release of airborne fibers during maintenance activities of a variety of household appliances. This work involved collecting source, personal and area samples during well-characterized maintenance activities in a large exposure chamber under a range of ventilation conditions. The samples were analyzed using various analytical techniques to permit direct comparison with other historical studies. Project included developing time-activity exposure pattern profiles for maintenance workers.

For a major equipment manufacturer, performed a detailed evaluation of removal of various air pollutants by a new, innovative pollutant removal technology. This involved development of a fully instrumented, 1700 square foot test house/chamber in which several pollutants, including gases, particles, and biological agents, could be precisely released over time and their removal rate accurately monitored. In this multi-phase interventional study a program was designed to determine system efficacy and a corresponding performance model was developed.

For a large urban teaching hospital, developed an evidence based design guide for new orthopedic operating rooms based on control of airborne infectious agents. This involved evaluating the international scientific literature regarding infections from airborne particles, critically reviewing current design guides and their underlying rationale, developing a reproducible test procedure that can be used to characterize the control of potentially infectious particles, and using the testing protocol to compare the effectiveness of the various designs located at multiple institutions.

Developed a controlled chamber test to determine the emission rate of silica and respirable dust from various concrete cutting tools under varying environmental conditions. This test also provided information on particle size distributions associated with various operations.

For a major university, led a multidisciplinary team in developing a detailed characterization study regarding potential exposure to polychlorinated biphenyls (PCBs) used in building materials. This involved a review of plans, specifications and architectural drawings to identify likely areas of use, developing a comprehensive sampling program to verify emission rates and incorporating this into an exposure model that included various building dynamics parameters such as solar loading, seasonal effects, ventilation patterns, and building pressurization.

Managed a comprehensive testing and analysis program designed to evaluate emissions of radiation from various building materials, including granite and marble for a large national distributor. The work involved developing testing protocols, measuring alpha and gamma emissions from the products under both controlled and real world conditions, and developing exposure estimates for various usage scenarios.

Developed a series of validation tests for fume hood orientations for a large medical research facility. This work involved building a mock-up of the research pod in a controlled test chamber and measuring emissions of a variety of possible contaminants from various operations and procedures that were performed in the containment. These systems were evaluated for various configurations, air exchange rates, and diffuser velocities.

Managed the assessment of emissions of sucrose residue from building materials in an historic structure that was being rehabilitated to a biotechnology research center. This work involved establishing test protocols to evaluate impact environmental conditions such as heat, pH, and moisture. Independent test cells were established at the facility and tests performed in situ.

Managed a program to determine the source of significant noxious odors in a twenty-eight story office tower. By establishing a series of isolated test cells within the building, the odor was isolated to butyric acid residue found in acoustical ceiling tiles located in various areas throughout the building. Additional chamber testing determined the environmental conditions under which butyric acid residue would be released. This data was then used to set allowable limits for acceptable performance during the manufacturing process.

Directed a study for a major hotel chain to evaluate emission of various organic compounds from water that was being processed through a new filtration/aeration system. This work involved developing and implementing a multifactorial study design to evaluate potential emissions that could be released under various operating conditions and different chemical composition of the source water.

Ambient Environments

Directed air quality impact assessment of Central Artery Vent Building No. 3 on surrounding community. Performed air quality studies including risk assessment for dispersion modeling of NO₂,

CO, and PM₁₀ impacts. The work supported an air rights development of property owners and required close interaction with CA/T and Massachusetts Department of Environmental Protection (MADEP).

Provided air quality modeling, risk assessment and atmospheric monitoring of CO, NO₂ and PM₁₀ for an apartment/hotel complex to assess potential impact of relocating an access ramp and rerouting vehicular traffic due to CA/T construction.

Provided risk assessment and environmental impact analysis of proposed roadway construction around the Massachusetts General Hospital and Spaulding Rehabilitation Hospital. The work involved negotiating appropriate air quality action levels with MADEP and development of mitigation strategies. As a follow-on project to this, Dr. McCarthy developed and implemented an atmospheric sampling program to verify compliance of the construction program with control measures.

On behalf of the CA/T, principal-in-charge of an air quality impact assessment for the City of Boston's East Boston community during construction of the Third Harbor Tunnel and proposed construction of a hazardous waste incinerator. This involved dispersion modeling and analysis, risk assessment and risk communication.

Principal-in-charge of development of a comprehensive air monitoring program and community impact evaluation for development of a 78-acre contaminated property. In addition to developing a complex monitoring network, this work involved developing appropriate air quality action levels and mitigation measures for permit hearings. This has also involved community liaison and negotiations with state and local authorities.

Directed detailed analysis of the University of Vermont's medical incinerator for an air permit. This work involved assessing possible emissions, providing dispersion analysis, and risk characterization.

For the City of Boston, performed a detailed line source analysis of rerouting traffic due to CA/T activities.

For the City of Cambridge, performed a detailed analysis including atmospheric dispersion analysis and risk assessment for bridge construction and resultant traffic for Charles River span (Scheme Z).

Conducted a detailed analysis of impact of exhaust stack emissions for the University of Cincinnati. This work involved developing a near-field dispersion model, site monitoring to validate performance and making mitigation recommendations.

Principal-in-charge of a detailed analysis and monitoring study (CO, NO₂, PM_{2.5}, elemental carbon, speciated VOCs) to characterize exposure of toll collectors to vehicular traffic.

Led a detailed reconstruction of exposure to combustion byproducts of a potentially impacted population using atmospheric modeling after a truck fire which involved hazardous materials. This involved profiling truck contents, estimating emissions rate and dispersion of combustion byproducts and determining estimates of exposure at the receptor locations.

Led the analysis of the environmental impacts from roadway emissions during a major five highway study in Las Vegas, Nevada. This work involved detailed characterization of air toxics, air quality modeling, and identification of highest impact areas. Continuing work involved development and implementation of remedial measures as part of a settlement program.

Indoor Environments

Led the expert team supporting the U.S. Army Criminal Investigation Division's investigation of potential environmental and building factors associated with 11 reported infant deaths in Army housing at Fort Bragg. A primary objective of the investigation was to evaluate the claim that the infant deaths were related to "Chinese Drywall" in the housing units. In addition, the investigation involved a multi-pathway assessment of potential indoor environmental contaminants including: VOCs, aldehydes, fungi, pesticides, allergens, metals and water quality. Building factors evaluated included: mechanical systems, ventilation and building envelope performance.

Principal-in-charge of more than 2,500 indoor environmental quality assessments in large office buildings, industrial facilities, schools, hospitals, residences, and other locations.

Principal-in-charge for design and implementation of specialized IAQ and IEQ monitoring programs.

Community and building occupant/employee liaison in IEQ investigations, providing risk characterization and risk communication services.

Principal-in-charge of EH&E's study team for U.S. Environmental Protection Agency's (EPA) *Building Assessment Survey and Evaluation (BASE) Study*. Dr. McCarthy assisted EPA in developing the study design and protocols, and directed EH&E's study team in the investigation of 100 buildings over a five-year period.

Principal-in-charge of the EPA contract "Technical Support for Indoor Air Issues."

Principal-in-charge of the Centers for Disease Control and Prevention, National Institute of Occupational Safety and Health contract "Building Related Asthma in Office Buildings and Schools".

Liaison with and consultant to various local, state, and federal agencies.

Development and implementation of health and safety programs in hazardous industrial settings.

Assembly and management of rapid response teams charged with the assessment of potentially toxic conditions on a variety of sites ranging from transformer fires to areas contaminated with polynuclear aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs), and heavy metals, including the mapping of areas of contamination onsite and development of site monitoring programs for the remediation phase and perimeter monitoring programs at hazardous waste sites.

Development of protocols for air, soil, and surface sampling for toxic compounds.

Developed and taught IAQ professional development training programs for building owners, managers, industrial hygienists, and engineers. This work has included a training program for NASA, several *Fortune 500* companies, and a complete revision of EPA's "Orientation to Indoor Air Quality," which is presented nationwide.

Led the hazard characterization and remediation program for the disaster recovery of a major laboratory/vivarium complex that had experienced a fire. This involved detailed contamination mapping of soot and metals throughout the 400,000 square feet impacted by the fire. This data was then used to characterize risk and develop cleanup criteria.

Infectious Agents

For a major teaching hospital, led the analysis of infectious risk potential for the first OR in the U.S. to provide interventional radiologists and surgeons with immediate access to a full array of advanced imaging modalities for use during multiple procedures. The traditional placement of supply air diffusers was not feasible due to the design of the clinical equipment being installed. By using advanced computational fluid dynamic (CFD) modeling, Dr. McCarthy evaluated multiple HVAC configurations and airflow patterns for critical infection control and optimal thermal comfort. The results identified a diffuser array in a non-traditional configuration would be equally effective in preventing particles (skin cells) from impacting the surgical site when compared to conventional systems. This approach not only was subject to peer review by surgical and mechanical design teams, it also had to pass regulatory approval from the Department of Public Health, which it did successfully, before licensing.

For a large urban teaching hospital, developed an evidence based design guide for new orthopedic operating rooms based on control of airborne infectious agents. This involved evaluating the international scientific literature regarding infections from airborne particles, critically reviewing current design guides and their underlying rationale, developing a reproducible test procedure that can be used to characterize the control of potentially infectious particles, and using the testing protocol to compare the effectiveness of the various designs located at multiple institutions.

Established and led an interdisciplinary team for a major teaching hospital that was charged with reducing inadvertent exposure to environmental opportunistic pathogens (e.g., *Aspergillus, sp.* and

Legionella, sp.) and airborne pathogens (e.g., mycobacterium tuberculosis and varicella-zoster virus). This team identified surveillance techniques, response actions, design for physical isolation of infectious individuals and developed a policy that has been successfully implemented in this 1200 bed facility.

For a major cancer treatment center, developed a method of commissioning and verifying performance of building systems and isolation facilities for state of the art bone marrow transplant facility utilizing evidence-based design and implementation of comprehensive testing procedures. After performing a design review, comprehensive testing of sub-components such as HEPA filters, evaluation of means to optimize airflow within the suites, and ensuring appropriate pressure relationships within various areas of the facility was completed and documented.

Dr. McCarthy has been the Principal in Charge of more than twenty environmental investigations regarding assessment of infections related to *Legionella* bacteria. This work has involved reviewing epidemiological data, investigating and sampling potential sources, and overseeing implementation of corrective activities. This has taken place in environments as diverse as hospitals and hotels to retail establishments.

PROFESSIONAL REGISTRATION

American Board of Industrial Hygiene Certified: Comprehensive Practice

PROFESSIONAL AFFILIATIONS

American Industrial Hygiene Association
 International Society of Indoor Air Quality and Climate
 American Society for Testing and Materials
 American Conference of Governmental Industrial Hygienists
 American Society of Healthcare Engineers

COMMITTEE MEMBERSHIP

American Society of Heating, Refrigeration, and Air-Conditioning Engineers, Inc.
IAQ 2004 Conference Chairman
 American Society of Heating, Refrigeration, and Air-Conditioning Engineers, Inc.
Guideline Project Committee 10 P, Criteria for Achieving Acceptable Indoor Environments

SELECTED PUBLICATIONS

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